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545/1

CHEMISTRY

Paper 1

2024

2 hours

INTERNAL MOCK SET TWO

CHEMISTRY

Paper 1

2 hours

INSTRUCTIONS TO CANDIDATES:

This paper consists of two sections: A and B. It has six examination items.

Section A has two compulsory items.

Section B has two parts: two parts I and II. Answer one item from each part. Answer four items in total.

Answers in section A must be written in the spaces provided while those of section B must be written in the answer booklet provided.

Any additional items answered will not be scored.

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SECTION A

Answer all the items from this section.

Item 1

Opio and Mary, both senior two students of EKK college school, participated in the music and drama house competitions. After the event, they experienced mild pain in their hands, aching leg joints and headaches. Upon arriving home, Opio's mother gave him an extract of lemon grass to ease his discomfort, while Mary's father gave her paracetamol tablets. After three hours of rest, Opio's condition remained the same, but Mary's pain and headache had completely gone away.

Task:

As a chemistry learner:

a) Explain

- i. The categories of the products Opio and Mary used.

Both Opio and Mary used medicines, Opio was given a traditional medicine while Mary was given a modern medicine, an analgesic which relieves pain and inflammation.

(score 03)

- b) Advice Mary and Opio the challenges associated with the long-term use of the products.

The medicines can result to allergic reactions leading to stomach disorders like diarrhoea.

This can be mitigated by seeking the doctors' instructions before taking any medicine.

Continuous use analgesics results to acute inflammation of the pancreas thus resulting to body discomfort and malfunctioning.

This can be mitigated by seeking the doctors' instructions before taking any medicine.

Evaluation:

Both are analgesics

Traditional medicines take long time to act while modern medicines have a fast response action.

Traditional medicines have fewer side effects compared to modern medicines.

(score 05)

Item 2

A new juice company in Soroti district is in need of plastic bottles for packaging their juice. The production manager is in need of good quality bottles that are environmentally friendly. There are various plastics available on market. The manager is seeking for more clarity on the different plastic brands.

He is aware that selecting quality plastic depends on the nature of the material.

Task:

As a learner of chemistry:

a. Explain

i. Category of the product.

The product is a synthetic polymer, because it is made by man through the process of polymerization. Examples include polythene, poly vinyl chloride (PVC) and plastics.

(score 03)

• Category (C) • Reason (R) • Example (E₁, E₂, E₃)

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ii. The suitability of the material for the selected product.

Plastics have the following properties:

- They are water proof because they are not porous. ✓ P
- Resistant to chemical and weather attack thus able to last longer. ✓ P
- Poor conductor of heat and electricity. ✓ P
- Easily moulded into different shapes and sizes. ✓ P
- Do not rust thus last longer. ✓ P
- Light, low density thus easy to carry ✓ P

Use of the product.

Plastics are light therefore more appropriate for use in manufacturing packaging materials since they facilitate easy carrying. ✓ U

- Property (P)
- Use (U)

(score 03)

b. Advise the manager on the choice of the product.

Plastics are non-biodegradable or don't decompose therefore result to both water and soil pollution hence lowering the soil productivity. ✓ E

This can be **mitigated through:**

- recycling of plastics. ✓ M
- promoting re-use of plastics. ✓ M
- use of biodegradable. ✓ M

- Effect (E)
- Mitigation (M)

(score 02)

SECTION B**Part 1**

Attempt only one item from this part.

Item 3

Agriculture is the backbone of Uganda, in some districts of Uganda like Kasese and Tororo, farmers get very low yields due to exhausted soils this has led to famine out break in the areas.

Ammonium nitrate is one of the effective fertilizers used to improve crop yields, The ministry of agriculture through the government of Uganda has cleared a local inventor to set up an ammonium nitrate production plant Mukono industrial area such that the fertilizer is got at a cheaper cost. However, the community near the production plant is worried about its effects on the environment and how the process will occur.

The head of chemistry department at your school has appointed you to sensitize other learners.

Task:

Prepare a presentation you will make during the meeting.

(score 09)

Item 4

Due to increased population growth in Uganda, the electrical engineering forum has raised a concern of reduced copper wires in the country. In response, the government has contracted an inventor to set a new copper extraction plant in Kasese district.

However, the community near the production plant is worried about its effects on the environment and how the process will occur.

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The head of science department at your school has appointed you to sensitize other learners during the science club meeting

Task:

Prepare a presentation you will make during the meeting.

(score 09)

Part 2

Attempt only one item from this part

Item 5

Natural resources have been destroyed as a result of increasing population and human activities. This has attracted the attention from the National Environment Management Authority (NAME). The officials are planning to create awareness to the people of the county through sensitization workshops organized in different districts communities.

Task:

As a chemistry student, prepare a short presentation you will deliver during the workshop upon invitation.

(score 08)

Item 6

People have encroached on wetlands in search for land for settlement and setting up industries. This has caused major problems to the country and prompted government to come up with a campaign to conserve the wetlands.

Your school has been selected to champion this campaign in the country.

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Task:

As a member of the campaign team in your school, make a write up of the message you will be presenting to the people when you are called upon.

(score 08)

Item 3**Manufacture of ammonium nitrate fertilizer**

<i>Process of production</i>	<i>Side effects of the production plant on environment, how it occurs and its mitigation</i>	<i>Social benefits of the production plant.</i>
<ul style="list-style-type: none"> Nitrogen gas from fractional distillation of liquid air is reacted with hydrogen gas from natural gas in a ratio of 1 to 3 respectively in the presence of finely divided iron catalyst at high pressure and low temperature during the Haber process to produce ammonia gas in a closed cylinder. Equation..... Ammonia gas produced is reacted with oxygen in closed tank in presence of platinum catalyst producing nitrogen monoxide and water. Equation..... 	<p>Destruction of vegetation cover to create space for construction and installing of production machines. This leads to accumulation of carbon dioxide gas in the atmosphere thus global warming.</p>	<p>Source of employment opportunity to the locals, improved income therefore improved or better standards of living.</p>

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<ul style="list-style-type: none"> • Nitrogen monoxide is further reacted with oxygen to form nitrogen dioxide. ✓cp Equation..... • Nitrogen dioxide gas is dissolved in water in presence of oxygen gas in a tank to form nitric acid. ✓cd. Equation..... • Nitric acid is heated with ammonia gas to form ammonium nitrate. ✓cd 	<p>Mitigated by planting trees that mature and grow faster since trees use carbon dioxide during photosynthesis. ✓m</p> <p>Release of toxic fumes containing mainly nitrogen oxides for the industry resulting to air pollution and increase in the greenhouse effect, therefore increase in temperature and climatic changes. ✓</p> <p>This can be mitigated through: Fitting catalytic converters in the industry chimneys to remove nitrogen oxides to form nitrogen gas. ✓m</p>	<p>Impact</p> <p>Explanation.</p>
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Item 4

Extraction of copper.

Process of production	Side effects of the production plant on environment, how it occurs and its mitigation	Social benefits of the production plant.
<p><u>Extraction of copper from copper pyrites involves the following major stages:</u></p> <p>a) Concentration of the ore:</p> <ul style="list-style-type: none"> The ore is crushed and ground to fine powder, mixed with oil and water in a tank to remove impurities. Compressed air is blown through the mixture in the tank a process known as froth flotation, to agitate the mixture. Oil coated particles of the ore float on top of the tank and are skimmed off and dried. <p>b) Reduction or roasting of the ore:</p> <ul style="list-style-type: none"> Copper pyrites are roasted in a furnace to form copper(I) sulphide, iron(II) oxide and Sulphur dioxide gas. <p>Equation.....</p> <ul style="list-style-type: none"> Silicon dioxide is added to the residue in the furnace. Where it reacts with iron(II) oxide to form iron(II) 	<p>Air pollution by waste gases, sulphur dioxide which is an acidic gas thus result to acidic rains which deplete buildings, low the pH of water and soil thus low crop yields and soil productivity.</p> <p>Mitigated by fitting filters or scrubbers in chimneys to remove sulphur dioxide.</p>	<p>Source of employment opportunity to the locals, improved income therefore improved or better standards of living.</p>

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<p>silicate, slag leaving behind the copper(I) sulphide.</p> <p>Equation.....</p> <ul style="list-style-type: none"> Slag floats on top of the mixture and it is skimmed off. The copper(I) sulphide is heated strongly in a furnace with limited supply of oxygen to form impure copper and sulphur dioxide gas <p>Equation</p> <p>c) Refining:</p> <ul style="list-style-type: none"> The impure copper is purified by electrolysis using impure copper as anode and pure copper as cathode in an electrolyte cell containing acidified copper(II) sulphate solution as electrolyte. Impure copper dissolves to form copper(II) ions and pure copper is deposited at the cathode. <p>Equations.....</p>		
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Note:

The process of production is composed of the following:

- All the necessary raw materials.
- Vessel.
- Chemical process.
- Physical process.
- Conversion to the desired product.
- Purification.

Rm
V
Cp
Pp
Cd
Pr

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Item 5

Category of natural resource	<p>Natural resources are of two categories:</p> <p>1) Renewable natural resources: ✓ <i>C1</i></p> <ul style="list-style-type: none"> • These are easily replaced once used. ✓ <i>R1</i> • Resource that can be used over and over again without getting replenished. ✓ <i>R1</i> • Resources that do not easily get exhausted once used. ✓ <i>R1</i> <p><u>Examples of renewable natural resources include:</u></p> <ul style="list-style-type: none"> • Water bodies made up of water which is composed of hydrogen and oxygen. ✓ <i>CP</i> • Forests made up of trees composed of carbon, hydrogen and oxygen. ✓ <i>CP</i> <p>2) Non-renewable natural resources: ✓ <i>C2</i></p> <ul style="list-style-type: none"> • These are resources that get exhausted once used. ✓ <i>R2</i> • Resources that get replenished over a short period of time. ✓ <i>R2</i> • Resources cannot easily be replaced once used. ✓ <i>R2</i> <p><u>Examples of non-renewable resources include:</u> ✓ <i>CP</i></p> <ul style="list-style-type: none"> • fossil fuels composed of carbon and hydrogen. ✓ <i>CP</i> • Rocks composed of calcium carbonate and minerals like gold, copper and iron. ✓ <i>CP</i>
Impact of exploitation of natural resources by man's activities on the environment.	<p>✓ Industrisation, promotes destruction of vegetation e.g. forests are cleared to create space for setting and building of industries this results to increased greenhouse effect due to accumulation of carbon dioxide in the atmosphere thus leading to global warming, increased temperatures and famine in the area.</p> <p>This can be mitigated through:</p> <ul style="list-style-type: none"> • Government putting up strict laws against forests encroachment. ✓

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	<ul style="list-style-type: none"> • Carrying out reafforestation by planting trees that manure and grow faster. ✓ ✓ Industrisation, industries release their untreated industrial wastes into water bodies resulting to water pollution and growth algal blooms this affects the water quality and death of aquatic organisms due to chemicals from industries. <p>This can be mitigated through:</p> <ul style="list-style-type: none"> • Industries should treat their industrial wastes before released into the water bodies to minimize the problem of water pollution. ✓
<i>Benefits of natural resources</i>	<ul style="list-style-type: none"> • Forests reduce on the greenhouse effect, since the trees use carbon dioxide gas during photosynthesis thus reducing its concentration in the atmosphere. ✓ • Forests are essential during the rain formation, since the tree carry out transpiration therefore forming water vapour that condenses to for rain ✓ • Water bodies with <i>running water</i> are essential in the generation of hydroelectricity since it is able to drive turbines to generate electricity. ✓

Growth is painful.

Change is painful.

But nothing is as painful as staying stuck where you do not belong.

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